



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,471	03/09/2004	Leilei Zhang	X-1574 US	2282
24309	7590	03/06/2007	EXAMINER	
XILINX, INC ATTN: LEGAL DEPARTMENT 2100 LOGIC DR SAN JOSE, CA 95124			DIAZ, JOSE R	
			ART UNIT	PAPER NUMBER
			2815	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/06/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/796,471	ZHANG, LEILEI	
	Examiner José R. Diaz	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 02 February 2007.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 22-30 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-21,31 and 32 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 18 December 2006 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All
  - b) Some \*
  - c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ .	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input type="checkbox"/> Other: _____ .

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 2, 2007 has been entered.

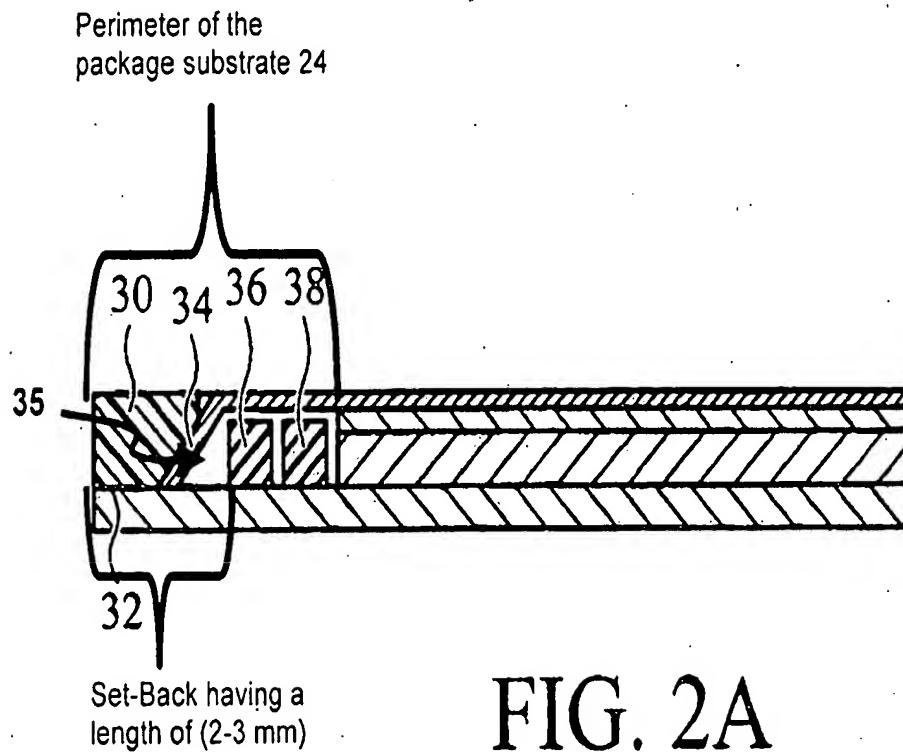
### ***Specification***

2. The amendment filed February 2, 2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the original disclosure does not support the subject matter now added to paragraph 0030 since the original disclosure fails to suggest, explicitly or implicitly, that no molding compound is introduced in the space 35, as now proposed by applicant. To the contrary, the original disclosure suggests that molding compound is added in the argued space. For example, paragraph 0030 (of the original specification) discloses that the molding compound is formed on "about 2 mm to about 3 mm of the perimeter of the package substrate 24" [emphasis added]. In addition, paragraph 0030 discloses that "[T]he set-back from the edge of the package substrate 24 to the chip capacitors 36, 38 is typically about 2-3

mm," which is the same length or region disclosed for the molding compound. Please note that this set back region includes the argued space 35 (see fig. 2A, attached below). Thus, the molding compound is also present in the space 35.

In addition, the proposed figures are objected since the cross sectional view as shown in figure 2A does not correspond to the cross section taken along the proposed line A-A in figure 2B. For instance, figure 2A shows a sloped wall (34) completely covered (from top to bottom) with molding compound (30). However, line A-A in figure 2B shows a partially covered sloped wall (34) (see the top portion of the sloped wall that is not covered with molding compound 30). Therefore, the figures remain objected by the examiner.

Applicant is required to cancel the new matter in the reply to this Office Action.



***Drawings***

3. The drawings are objected to because the disclosure fails to describe the "space" or "gap" that is enclosed by package lid 10, substrate 24 and semiconductor IC 26; and that surrounds chips 36 and/or 38 [see figures 2A and 2C]. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

Art Unit: 2815

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-21 and 31-32 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for forming the molding compound on the exterior surface of the sloped wall, does not reasonably provide enablement for the use of the term "only" as recited in the amended claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

In addition, the disclosure fails to describe how the chips (36) and (38), and the interior walls of the package lid (10) are protected from being encapsulated with molding compound (30), especially when vents or holes are provided on the package lid (10) [see paragraphs 0025 and 0026 in applicant's specification]. Please note that these holes or vents inherently allow air and/or the molding compound to pass through the package lid to form an encapsulant for enclosing an "internal" chip [see figure 3 in Fishley et al. (US 6,654,248); figure 2 in Tang et al. (US 6,246,115 B1); figure 4 in Yang et al. (US 6,433,420 B1); figure 2 in Liu et al. (US 6,486,564 B2); and figure 2 of Liu et al. (US 6,278,182 B1)].

#### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

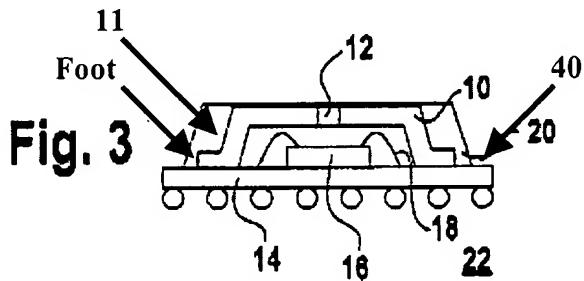
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. As far as understood, claims 1, 3-5, 7-10, 15, 19, 21 and 31 remain rejected under 35 U.S.C. 102(a,e) as being anticipated by Fishley et al. (US Pat. No. 6,654,248 B1).

Regarding claims 1 and 31, Fishley et al. teaches a package lid for attaching to a package substrate of a packaged semiconductor comprising a sloped wall (11) configured to provide an exposed perimeter portion (40) of the package substrate (14) [see fig. 3, attached below]. With regards to the limitation that the sloped wall is used or configured to provide an exposed perimeter portion when the package lid is disposed on the package substrate, the court has held that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. See *In re Pearson* 181 USPQ 641 (CCPA 1974) and *In re Swinehart* 169 USPQ 226 (CCPA 1971). In the instance case, Fishley et al. teaches a sloped wall (11) configured to provide an exposed perimeter portion (40) of the package substrate (14) when the package lid (10) is disposed on the package substrate (14) to allow application of a molding compound (20) on the exposed perimeter portion (40) of the package substrate (14), the molding compound (20) contacting the sloped wall (11) to secure the package lid (10) to the package substrate (14) of the packaged semiconductor (22) [see fig. 3,

attached below]. Thus, Fishley et al. anticipates the claimed invention since the prior art structure is capable of performing the claimed intended use.



Regarding claim 3, Fishley et al. teaches a foot ("foot") around at least a portion of the perimeter of the sloped wall (11), configured to contact the package substrate (14) when the package lid (10) is placed on the package substrate (14) [see figs. 1 and 3].

Regarding claim 4, Fishley et al. teaches the package lid (10) is a stamped package lid [please note that the lid was stamped or cut out to form opening 12. See fig. 3].

Regarding claims 5 and 7, Fishley et al. teaches a thickness of 0.5 mm [see col. 4, lines 1-3].

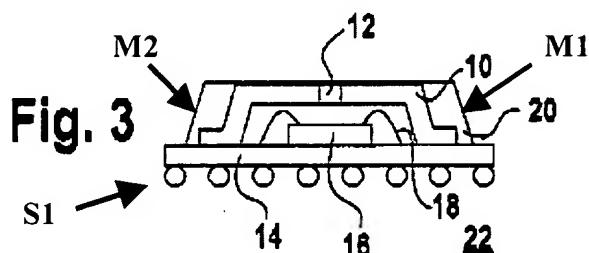
Regarding claim 8, Fishley et al. further teaches that the package lid comprises nickel-plated copper [see col. 4, lines 4-5].

Regarding claim 9, Fishley et al. further teaches a vent (12).

Regarding claim 10, Fishley et al. further teaches a vent (12) provided on the top side of the package lid (10) [see fig. 3].

Regarding claim 15, Fishley et al. further teaches that the package lid (10) is substantially rectangular [see fig. 1].

Regarding claim 19, Fishley et al. further teaches that the package lid (10) is disposed on the package substrate (14) to provide the exposed perimeter portion and further comprising: first molding compound (M1) applied to a first portion of the exposed perimeter portion (portion of substrate 14 covered with first molding compound M1) and contacting the sloped sidewall (11) [see fig. 3, below], and second molding compound (M2) applied to a second portion of the exposed perimeter portion (portion of substrate 14 covered with first molding compound M2) and contacting the sloped sidewall (11); wherein the first portion of the exposed perimeter portion is opposite the second portion of the exposed perimeter portion [see fig. 3, below].



Regarding claim 21, Fishley et al. teaches the package substrate includes a solder ball-grid array (S1) for connecting the packaged semiconductor to a printed circuit assembly [see fig. 3, above].

8. Claims 1, 3, 9-15, 19 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Tang et al. (US 6,246,115 B1).

Regarding claim 1, Tang et al. teaches a package lid for attaching to a package substrate of a packaged semiconductor comprising a sloped wall (321) [see figures 1 and 2]. With regards to the limitation that the sloped wall is used or configured to provide an exposed perimeter portion when the package lid is disposed on the package substrate, the court has held that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. See *In re Pearson* 181 USPQ 641 (CCPA 1974) and *In re Swinehart* 169 USPQ 226 (CCPA 1971). In the instance case, Tang et al. teaches a sloped wall (321) configured to provide an exposed perimeter portion (area not covered with molding 33) of the package substrate (30) [see figs. 1 and 2]. Thus, Tang et al. anticipates the claimed invention since the prior art structure is capable of performing the claimed intended use.

Regarding claim 3, Tang et al. teaches a foot (321c) around at least a portion of the perimeter of the slope wall (321).

Regarding claim 9, Tang et al. teaches a vent (326, 321a) allowing gases to escape during assembly of the packaged semiconductor to a printed circuit assemble [see figs. 1-2].

Regarding claims 10-11, Tang et al. teaches a vent (321a) in a side of the package lid.

Regarding claim 12, Tang et al. teaches a vertical wall (V1) around a top (322) of the package lid (32) [see fig. 2, attached above].

Regarding claim 13, Tang et al. teaches fiducial marks (consider protrusion P1 or 325) formed in the rim (V1) [see fig. 2, attached above].

Regarding claim 14, Tang et al. teaches fiducial marks (325a) formed in corners of a rectangular package lead (32) [see fig. 1].

Regarding claim 15, Tang et al. teaches a package lid that is substantially rectangular [see fig. 1].

Regarding claim 19, Tang et al. teaches a first molding compound (consider the molding compound 33 formed on the sloped wall (321) located on the left side of the structure as shown in figure 2). and a second molding compound (consider the molding compound 33 formed on the sloped wall (321) located on the right side of the structure as shown in figure 2).

Regarding claim 21, Tang et al. teaches a solder ball grid array (305) [see fig. 2].

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

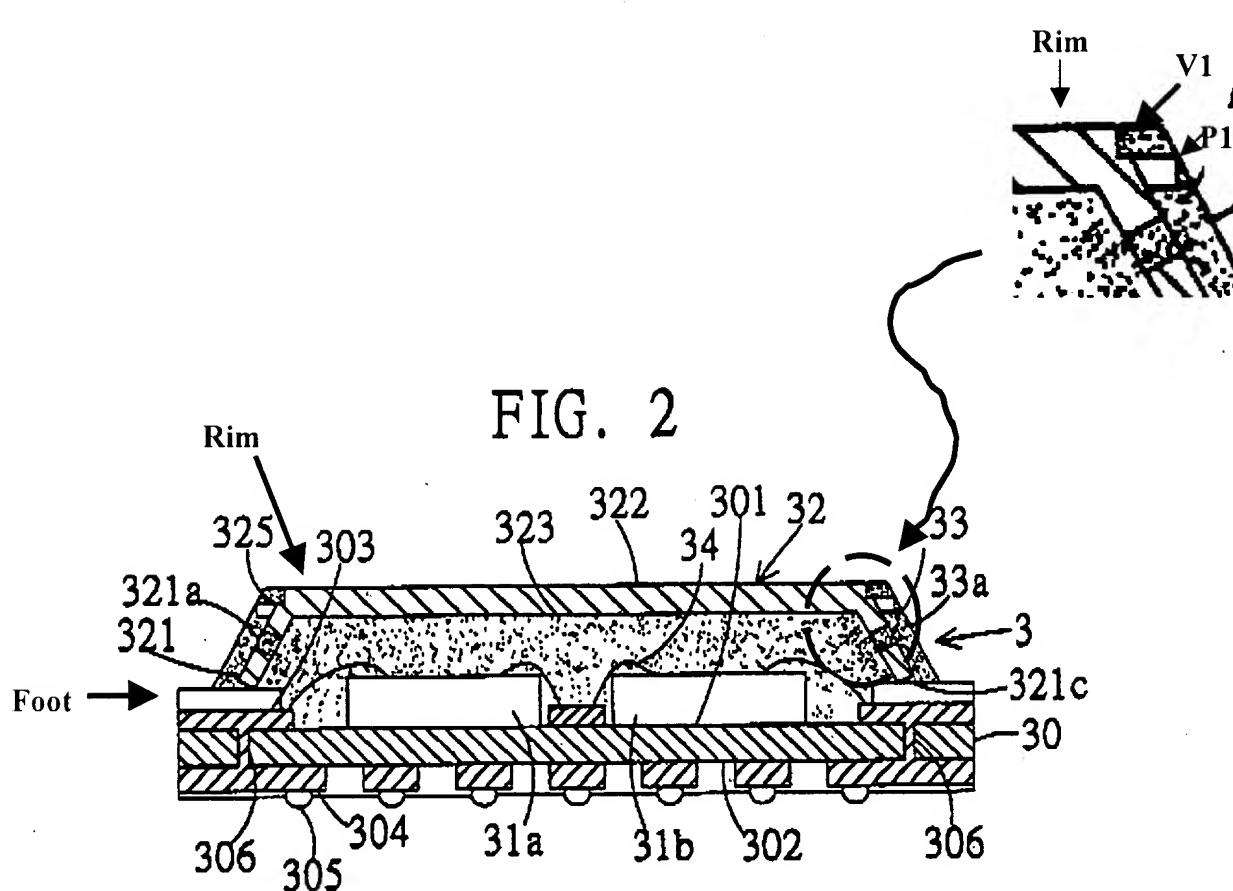
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. As far as understood, claims 2, 6, 16, 17 and 11-14 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Fishley et al. (US Pat. No. 6,654,248 B1) in view of Tang et al. (US Pat. No. 6,246,115 B1).

Regarding claim 11, Fishley et al. fails to teach a gap in the sloped wall. However, Tang et al. teaches the claimed limitation in figure 2. For instance, Figure 2 shows a gap (321a) in the sloped wall (321) of the package lid (32).

Fishley et al. and Tang et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include a gap in the sloped wall of the package lid taught by Fishley et al. The motivation for doing so, as is taught by Tang et al., is to enforce the bonding between the package lid and the encapsulant (col. 5, lines 7-8). Therefore, it would have been obvious to combine Tang et al. with Fishley et al. to obtain the invention of claims 11-14.

Regarding claim 2, Fishley et al. teach a sloped wall (11) which appears to be inclined at an angle of less than 90° [see fig. 3]. However, Fishley et al. fails to explicitly teach an angle of between 30° and 60°. Tang et al. appears to show a sloped wall (321) of about 45° [see fig. 2]. Thus, it would have been obvious to one of ordinary skill in the art to include a sloped wall having an angle of between 30° and 60°, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Huang*, 40 USPQ2d 1685,1688(Fed. Cir. 1996) citing *In re Aller*, 105 USPQ 233., 235 (CCPA 1955).



Regarding claim 12, Tang et al. teaches a vertical wall (V1) around a top (322) of the package lid (32) [see fig. 2, attached above].

Regarding claim 13, Tang et al. teaches fiducial marks (consider protrusion P1 or 325) formed in the rim (V1) [see fig. 2, attached above].

Regarding claim 14, Tang et al. teaches fiducial marks (325a) formed in corners of a rectangular package lead (32) [see fig. 1].

Regarding claims 6, 16 and 17, it is considered that these claims are *prima facie* obvious without showing that the claimed ranges achieve unexpected results relative to

Art Unit: 2815

the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

11. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fishley et al. (US Pat. No. 6,654,248 B1) in view of Yang et al. (US Pat. No. 6,433,420 B1).

Regarding claims 18 and 20, Fishley et al. teaches the exposed perimeter portion (40) of the package substrate (14) in figure 3. However, Fishley et al. fails to teach a package substrate comprising polymer material or an organic resin.

Yang et al. teaches that it is well known in the art to form the package substrate (10) of a polymer material or an organic resin [col. 4, lines 9-11].

Fishley et al. and Yang et al. are analogous art because they are from the same field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the package substrate taught by Fishley et al. of a polymer material or an organic resin. The motivation for doing so, as is taught by Yang et al., is to enhance the bonding between the package lid and the

encapsulant. Therefore, it would have been obvious to combine Yang et al. with Fishley et al. to obtain the invention of claims 18 and 20.

***Response to Arguments***

12. Applicant's arguments with respect to claims 1-21, 31 and 32 have been considered but are moot in view of the new ground(s) of rejection. Please note that this Office Action includes the same rejections and/or objections previously raised by the examiner in the Advisory Action mailed on January 23, 2007, which applicant failed to address in the submission filed on February 2, 2007.

***Correspondence***

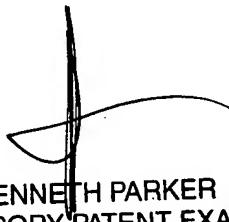
Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (571) 272-1727. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2815

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

José R. Diaz  
Examiner  
Art Unit 2815



KENNETH PARKER  
SUPERVISORY PATENT EXAMINER